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RELICS OF EARLY MAN IN WESTERN SWITZERLAND

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During the winter of 1853, as a result of the extremely low stage of the water of the Lake of Zürich, much of the bottom of the lake along the shores and in the shallow bays was exposed to view. In places groups of piles were noticed extending above the mud and sand. An examination led to the discovery that these had been the supports of ancient habitations, and search among them brought to light many implements and weapons of prehistoric origin. This led to the examination of the shores of other lakes throughout Switzerland, which resulted in the discovery of numerous ancient sites, including many on the lakes of Geneva, Morat, Bienne, and, probably the most important of all, Neuchâtel.

It soon became known that there were made "stations," dating from both the Stone and the Bronze age, on the margin of the Lake of Neuchâtel, but the depth of water made it very difficult to explore them, consequently very little work was done until some years later. Six years after the discoveries on the Lake of Zürich, while a railway embankment was in process of construction near the village of Concise, on the southwestern shore of Neuchâtel, the dredging of sand and mud from the bottom of the bay brought to the surface many implements and utensils as well as vast quantities of broken piles, revealing the site of an extensive settlement. The great number of objects recovered at that time and also as the result of subsequent explorations, now preserved in various collections and museums in Europe and America, are evidence of the importance of the settlement in prehistoric time. Concise has since

become one of the best known of the many stations on the Lake of Neuchâtel.

In 1877 the construction of a canal and the changing of the outlet of the lake resulted in the permanent lowering of the water more than three meters. This caused many more sites to be exposed, and the great number of objects collected at that time is beyond conception.

According to the Swiss archeologists there are on the margin of the Lake of Neuchâtel:

44 stations of the Stone age (Neolithic),
1 station of the Transition period (Eneolithic),
24 stations of the Bronze age,
1 station of the the Iron age,

making a total of seventy stations on a single lake a little more than twenty miles in length. But in reaching this conclusion they seem to have counted as distinct sites what appear to be only parts of a large settlement. For example, in the bay of Auvernier they counted four stations within a space of about 700 meters, yet it is evident that these were contemporaneously occupied and should be considered rather as parts of one village. The separation of a settlement into groups of habitations would be a natural precaution against fire, especially when the huts were constructed of wood and the coverings of thatch.

The stations of the Bronze age were built over deeper water and at a greater distance from the shore than were those of the earlier or Stone age. This is attributed to the possession of better tools, which enabled the builders to procure more easily the necessary piles; but it may also have resulted from necessity — to insure greater protection against attacks from the shore. The settlements during the later period were erected over five or six meters of water. Now, considering the piles to have extended about two meters above the surface of the water and to have been driven a meter or more into the sand or mud bottom, their total length must have approximated ten meters. Even with the improved and better implements, the construction of a platform covering several acres, upon which were erected the habitations, must have been an extensive undertaking. At that time a dense oak forest covered all the

hills and valleys and extended to the shores of the lakes. Probably the clearing made by the cutting of timber for the building of a village afterward served as the garden spot for its inhabitants.

As a result of the lowering of the lake level, the earlier or oldest sites, which were built in comparatively shallow water a short distance from the shore, are now high and dry. Many piles may yet be seen, some on shore but more along the margin of the water. In the bay of Auvernier, at a distance of from 10 to 20 meters from the shore, they may be counted by the score. It is an interesting fact that since the lowering of the water the vegetation that has sprung up along the lake shore is more luxuriant on the sites of the ancient settlements than elsewere.

The Stone and Bronze stations occur along the entire shore line, no part of it being occupied solely by the sites dating from one epoch. With the exception of a very few points the entire shore of Neuchâtel was well adapted to the purpose, the water being rather shallow for quite a distance from the shore. For the greater part the bottom is sandy, though in certain localities there are large glacial bowlders.

The only known settlement on the shores of Neuchâtel during the latest or Iron age was situated near the northeastern end of the lake, at the end of the water course known as La Tène, leading to the Lake of Bienne. The greater part of the site, which was rather extensive, has already been explored and many objects, including weapons and ornaments, utensils and implements, have been recovered. A very interesting collection is preserved in the museum at Neuchâtel, while other specimens have gone to enrich various collections in Europe and America. The material from La Tène was described by Vouga in 1885,[1] and in the following year by Dr Gross.[2] Both works contain many plates showing the most important of the numerous interesting objects discovered on the site prior to that time.

Like the settlement on Neuchâtel, the only known village during the Iron age on the shore of the Lake of Geneva was situated at the outlet of the lake, on the site of the present city of Geneva.

[1] *Les Helvètes à la Tène, Notice Historique*, par E. Vouga, Neuchâtel, 1885.

[2] *La Tène: Un Oppidum Helvète*, par Victor Gross, Paris, 1886.

The selection of these sites may have been a coincidence, but they were probably chosen for a definite reason.

The Stone Age

The stone implements, weapons, and ornaments recovered from the numerous sites on the Lake of Neuchâtel show in many cases a high degree of workmanship. The majority of the polished implements appear to have been made from natural pebbles, the hardest and toughest variety of stone being selected for the purpose. The theory is still held by certain Swiss archeologists that all the jade or nephrite used in making implements was brought from Asia. Nothing however could be more out of reason, for pebbles of nephrite have been found along the foot of the Alps. Nephrite is but one of the many hard materials used in the making of implements, and probably in no part of the world was a greater variety utilized.

As the southern part of the Lake of Neuchâtel belongs to the canton of Vaud, the majority of the objects discovered on the stations in that section have been deposited in the Musée Cantonal Vaudois in the city of Lausanne. The collection is very rich and complete, especially in implements of bone and stone remaining in the original handles of wood or antler — in some cases a combination of both. Of particular interest is a series of celts hafted in wooden handles. These may be separated into five distinct types: In the first and most primitive the celt is set directly into the wooden handle; in the second there is a short socket or foreshaft of antler between the celt and the handle; in the next type the celt is set into a section of antler perforated to allow the handle to pass through; while in the fourth type this is reversed, the antler foreshaft passing through a perforation in the handle. In some cases a large piece of antler served as the handle, the celt being set directly into it; this may be considered as the fifth and last type.

The first two are the more common types; the third is one of the rarest in Switzerland, although it occurs in France and elsewhere in central Europe.[1] Four forms of the first type are shown in figure 1, from sketches made by the writer from specimens in

[1] Sir John Evans, *Ancient Stone Implements*, p. 161.

the museum at Lausanne. The handles average about 500 mm. in length. These specimens are of special interest as suggesting the method employed by the Indians of North America in hafting similar implements. That most interesting and probably unique specimen now preserved in the American Museum of Natural History, New York City, is similar to form C in figure 1. It was found in the bed of a brook near Thorndale, N. Y., in 1850. The wooden handle was probably thick and heavy, terminating in a large knob;

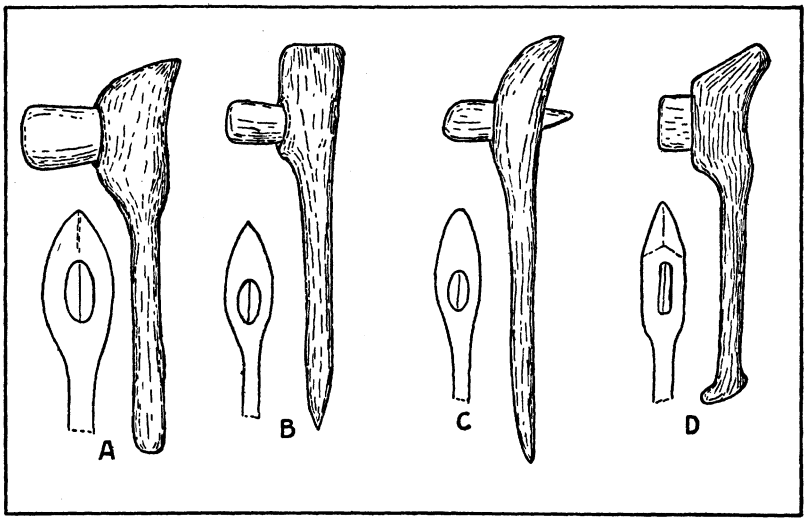


FIG. 1. — Four forms of the first type of mounted celts.

but during the many years it lay under water the wood gradually wore away until it assumed its present shape, as shown in figure 2.[1]

Large celts mounted similar to form A are now used by the Guayaquil Indians of Paraguay, while form B closely resembles the mounted battle ax of the Kaingaud Indians of Brazil. Examples of both are in Professor Giglioli's collection in Florence and have already been figured and described by him.[2] A similar form of hafting is used by the natives of New Guinea. We may assume that in America the celt was mounted as an ax and not as an adz.

[1] I am indebted to Mr Harlan I. Smith, of the American Museum of Natural History, for a photograph of and information concerning this specimen.

[2] *Internat. Archiv für Ethnog.*, suppl. zu Bd. IX, 1896, p. 25.

The perforated axes have been discovered in large numbers on the Neuchâtel sites. The great quantity of broken pieces that have been found is also remarkable; many were broken after having been finished, some during the process of boring — evidence of their having been made there. From the occurrence of numerous specimens in many localities it is evident they were used during the late Neolithic through the Eneolithic, and continued to be made and used in even greater numbers during the Bronze age. For this reason it is difficult to consider them as having been true axes used for cutting. Having implements of bronze, more easily made and certainly more serviceable, it is improbable that any people would have continued the shaping and use of implements of stone. Nor could these implements have withstood hard usage. They should therefore probably be classed as battle axes, or club heads; as such they would have been effective weapons.

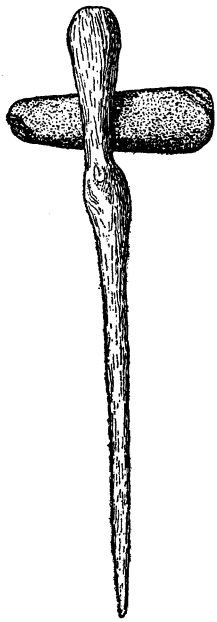
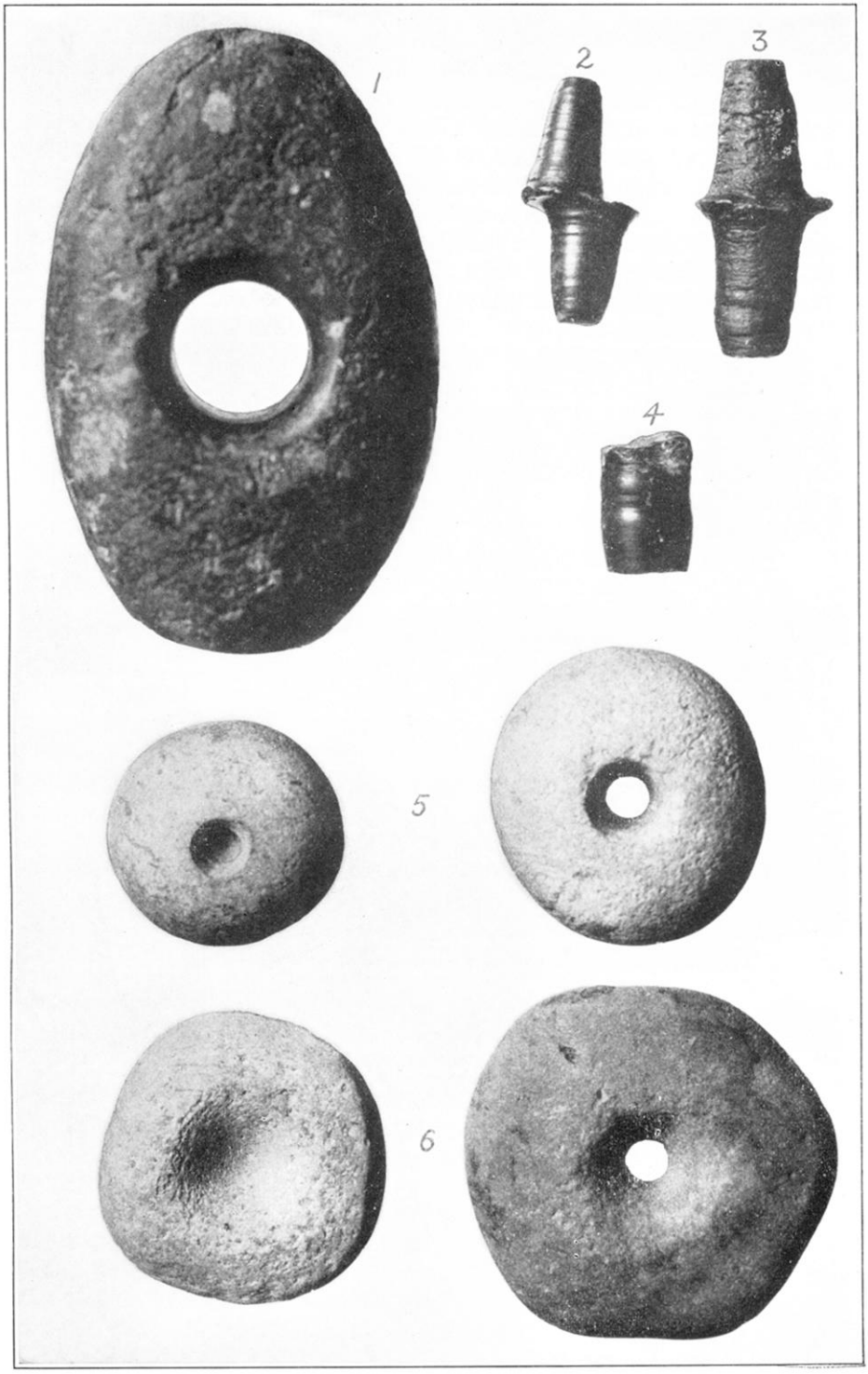


FIG. 2.—Celt in wooden handle from Thorndale, New York.

To attempt to describe the various types and forms of perforated axes from the stations on the Lake of Neuchâtel would require too much space. They range from the short, heavy, triangular, to the long type with flaring edge and formed into a knob or head at the opposite end. They were always made of hard material, often porphyry, granite, or quartzite; but apparently never of chert. There are several specimens in the Lausanne museum still retaining a portion of the original wooden handle driven securely into the perforation. Among the numerous examples in the Neuchâtel museum, none of which however retain, the handle, is one of an unusual form that was found some years ago near Bevaix. It is of diorite, measures 180 mm. in length, is ground to a sharp edge at each end, and the four sides are flat with rounded edges. The cutting edges, if such they may be termed, are about 30 mm. wide and the ax in the center is 47 mm. in thickness. The perforation



PERFORATED OBJECTS FROM PREFARGIER, LAKE OF NEUCHÂTEL (FULL SIZE)

1, By Hollow Drill. 5, By Solid Drill. 6, By Pecking.

which passes through the center is oval, and not circular as are all the others in the collection. The diameters of the opening are 15 mm. and 25 mm.; the longer follows the median line between the edges.

The interesting question, so often discussed, is, How were the perforations made? When a tubular drill was used a solid core was produced, as in the case of the modern diamond drill. Many of these cores have been found on the different sites, some of which are cylindrical, others conical. An interesting example of the latter found at Prefargier, near La Tène, on the Lake of Neuchâtel, is shown in plate 1, 2. This is the entire core. The boring having been made from the opposite sides, met near the middle, though overlapping, producing a core in the form of two cones.

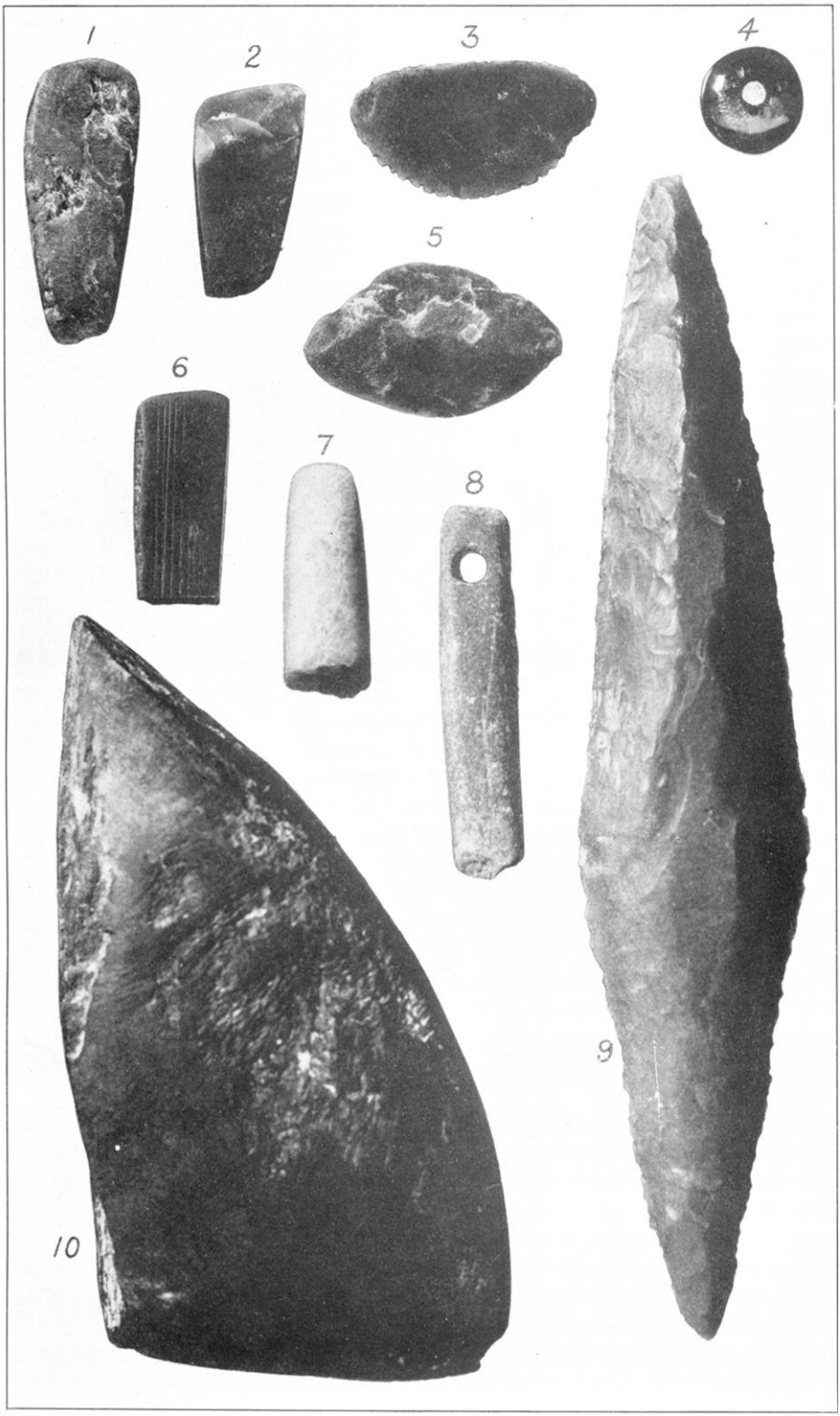
By experimenting I have been able to produce the same effect, although the material was much softer than that of which the axes are made. First a block of plaster of Paris, 44 mm. in thickness, and several cylindrical tubes of the same material were prepared. The latter, which served as drills, were 31 mm. in diameter; the diameter of the opening being 15 mm. made the thickness of the tube 8 mm. In drilling, dry sand was used. The boring was first made in one side to a depth of about 22 mm., then on the opposite side until the two met. During the process of boring the sand was fed to the drill from within the cylinder; this tended to wear away the core, causing it to assume the conical form. The core produced (pl. 1, 3) was of the same form and proportion as the one from Prefargier; the smaller end became just one-half the diameter of the opening in the drill. Another interesting result of this boring was the gradual wearing away of the outer surface of the drill, causing the hole to become smaller as it advanced. This may explain the occurrence of biconical perforations in many objects; whether the drill used was hollow or solid the effect would be the same.

Assuming the above to have been one method of perforation, what were the means employed? This question has often been discussed, and many are the theories that have been advanced in answer to it. I would suggest a hollow reed, or possibly a bone, used with sand and water; possibly small pieces of quartz could

have been attached to form a cutting edge. This simple drill without doubt would have produced the desired results, and the core would have been conical. The cylindrical core may be the result of a metal drill used during the Bronze age.

During the Neolithic age man had three methods of perforating stone. The first was with the hollow drill, as already described; the second with a solid drill; the third and most primitive way was by pecking or pounding the objects, usually on the opposite sides, until the hole was produced. In plate I are shown examples of objects perforated by the three distinct methods. The perforation in the club head (1) in the upper part of the plate was undoubtedly made by means of a hollow drill. Nos. 2 and 4 are stone cores from similar implements. Below these (5) are two natural pebbles showing the effect of a solid drill. The specimen on the right is perforated, the perforation being slightly biconical, the result of boring from opposite sides; the one on the left was not completed, the drilling on each side being in depth less than one-quarter the thickness of the pebble. The specimens numbered 6 are examples of the third method of perforating, namely, pecking or pounding the stone until the hole was formed. On the left is shown an unfinished piece, while that on the right is perforated. In these examples an equal amount of pecking had been done on both sides.

While the celt and the perforated ax are numerous, the grooved ax is the rarest of objects. There is one in the Neuchâtel museum, supposed to have been found on the station near Bevaix; but there appears to be some doubt about it. It is the only specimen of its kind in Neuchâtel, and there are none in the Lausanne collection; but there are three examples in the Musée de la Ville de Chambéry, Franc' that were found at à station in the Lake of Bourget, near Aix-l Bains, and only a short distance south of the Lake o Geneva. There seems to be no doubt as to the authenticity of these. They are of the ordinary form of grooved ax, about 150 mm. in length, and would readily pass for specimens from the Mississippi valley. The groove passes entirely round all three, and in this respect as well as in general form they also closely resemble the few specimens from southern Italy preserved in the Kircheriano Museum in Rome.



IMPLEMENTS OF STONE AND AMBER BEAD FROM PREFARGIER, LAKE OF NEUCHÂTEL (FULL SIZE)

The adz is another type of implement that is rare in Switzerland. One in its original wooden handle is in the museum at Lausanne. The blade is about 200 mm. in length and the cutting edge about 40 mm. in width. The blade passes entirely through the handle, which is about 500 mm. in length and not unlike form c in figure 1, except that the cutting edge is placed at a right angle to the handle.

The arrowpoints, which usually were made of chert, include several distinct types, but comparatively few specimens are found and the museums possess very small collections. In attaching the stone point to the shaft a notch was made into which the point was fitted and held with bitumen. There are several such specimens in the collections. There is also in the Lausanne Museum an antler tip, similar to the American specimens, about 50 mm. in length, which may have been a point for an arrow. But if this form of point had been widely used in Switzerland more examples would undoubtedly have been discovered on the various sites.

The chipped saws, or knives, are numerous, and many specimens in their original handles, some of wood, others of antler, have been found on various sites. These have often been figured and described. While at Prefargier I procured a very interesting small saw made of dark green jade; it is oval in form, 35 mm. in length and less than 2 mm. in thickness (pl. II, 3).

The chipped daggers, while inferior in workmanship to either the Danish or the Italian weapons, are the most interesting of the chipped objects found in the lakes. The largest example in the Neuchâtel museum, which with many smaller ones was found near Bevaix, is 225 mm. long and 34 mm. wide. There are two extremely interesting specimens in Lausanne which were recovered from the station at Chevroux on the Lake of Neuchâtel at the time the lake was lowered. They are of particular interest as they retain portions of the original wrapping which served as the handle. These and many other rare objects were illustrated in an album published by the Lausanne Museum in 1896 under the title *Antiquités Lacustres*.

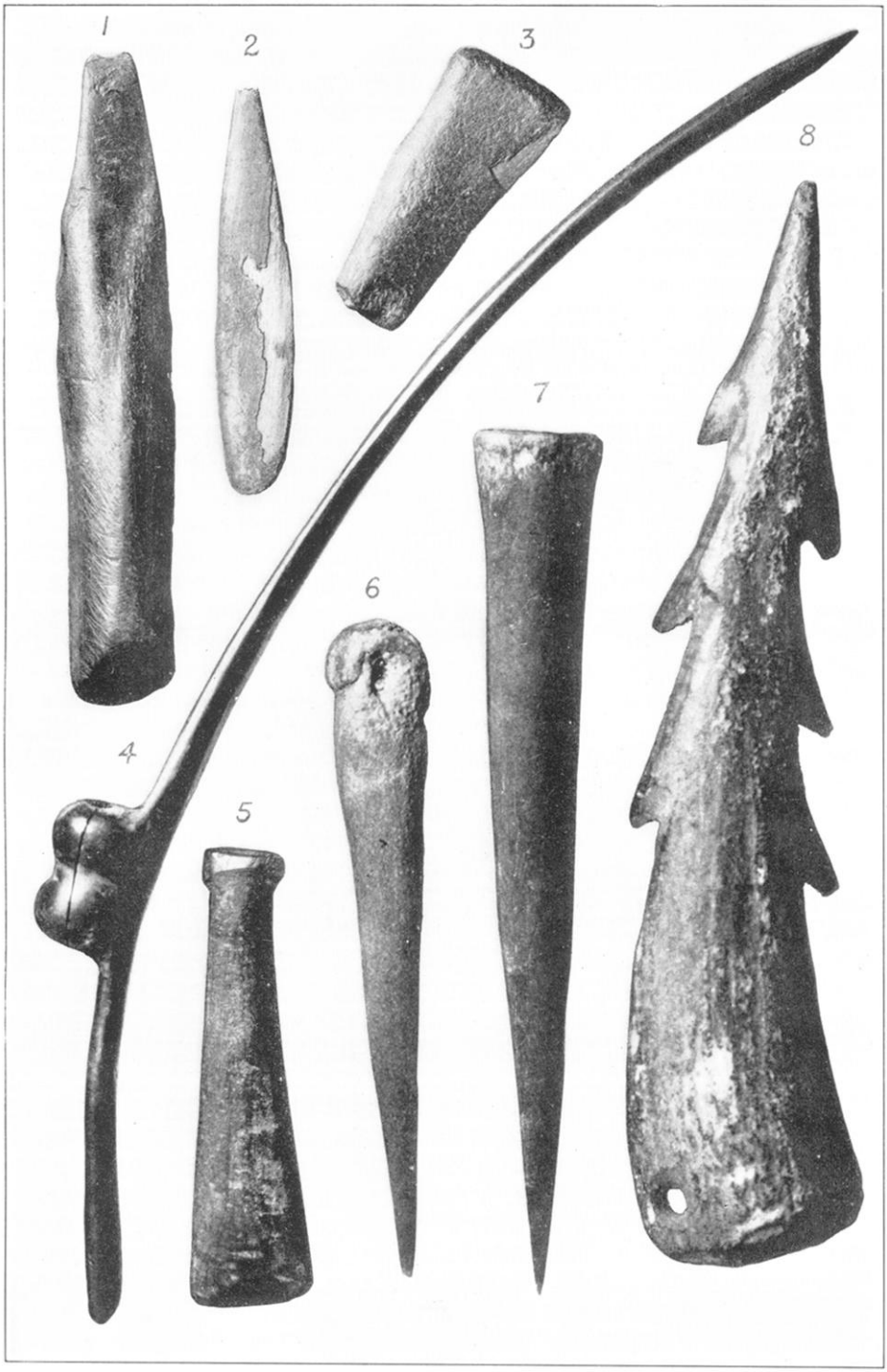
The daggers were of two types. In the first only one end was chipped to a point; in the second and rarer type both ends were

pointed. Plate II, 9, shows a very good example of this type; it is of translucent yellow flint and was found at Prefargier. In the same plate, 1, 2, 6, and 7 are typical examples of the small chisel. The first three are of a dark green jade or nephrite, and the fourth is a light bluish-green quartzite. The very beautiful example of an amber bead (4) is a comparatively rare specimen. The triangular cutting implement (10) is made of a dark mottled jade; it was probably never mounted, but was used in the hand; the shortest side is ground to an edge which has remained remarkably sharp. Figure 8 of the same plate is a perforated pendant, made of a soft material, from the same site.

During the Stone age bone and antler were also extensively used for making ornaments and implements of various sorts. Some interesting examples are figured in plate III. Nos. 1, 2, 3, and 5 are forms of bone chisels having one sharp edge. Nos. 6 and 7 may be classed as perforators. The long curved object (4) is called a hair-pin or ornament, but it is difficult to say for what purpose it was designed. The cylindrical projection at the side is perforated. The object is highly polished from use, and appears to be a very rare type, as only one or two similar specimens are in the Lausanne collection. The harpoon head (8) is of antler.

The Eneolithic or Transition Period

The Eneolithic or transition period between the Neolithic and Bronze ages is not clearly defined on Neuchâtel, and if such a period actually existed it was of brief duration. There are but fourteen objects in the Neuchâtel museum that are regarded as having been made of copper without an alloy, while there are probably as many hundreds made of bronze. In form they do not differ; all appear to have been made during the same time. In mixing the metals a greater or less quantity of tin was used, for it is not reasonable to suppose that with the primitive means and methods then in use it was possible to have always the same proportions. If, then, some object happens to contain a very small percentage of tin, or if the alloy is entirely lacking, why should those objects be considered to have been made during a distinct period?



OBJECTS OF BONE AND ANTLER FROM PREFARGIER, LAKE OF NEUCHÂTEL (FULL SIZE)

The Bronze Age

The vast numbers of bronze objects that have been recovered from the twenty-four stations of the Bronze age on the margin of the Lake of Neuchâtel show the great skill and ability of the makers. In workmanship, form, and decoration they cannot be surpassed in any other part of Switzerland. Axes of various types, javelins and arrows tipped with bronze points, and thin-bladed swords and daggers of bronze were the principal weapons of that era.

The narrow, curved knives, often decorated with incised lines forming various designs, are quite numerous, many having been found still attached to their original antler handles. The massive, highly decorated bracelets and pins or hair ornaments, large buttons and needles, pendants, rings, and many other objects, all of bronze, that have been found in great quantities are now to be seen in many museums and collections.

Probably the rarest and most interesting bronze objects are the large kettles and bowls (*situlæ*) which appear to have been made of a single piece of metal hammered into shape. There are several such bowls in the Lausanne collection, well formed and beautifully decorated; they average about 200 mm. in diameter and 60 mm. in depth. During April of the present year (1905) two large bronze kettles, 250 mm. in diameter and depth, were found near Cudrefin, across the lake from the city of Neuchâtel. Both are without decoration of any sort. Having handles for suspension, they probably served as cooking utensils.

During the same period the art of pottery making became greatly improved. The rough undecorated ware of the earlier epochs was no longer made except as cooking vessels, and the characteristic examples of the potter's art during the Bronze age are rather small cups and bowls, well shaped and often elaborately decorated with incised lines in geometric patterns. Many entire specimens have been recovered from the ancient site near the present town of Corcelette on the Lake of Neuchâtel. From the same site were taken a few pieces of ware decorated in red, cream, and black. Another method of decorating the smaller pieces was by attaching narrow strips of tin, usually about 5 mm. in width, in simple geo-

metric patterns, to the surface, often as a border near the mouth or edge. There are a number of specimens decorated in this manner in both the Neuchâtel and Lausanne collections. It has not yet been ascertained by what means the tin was attached, but the work was skilfully done, and after the lapse of many centuries often remains so firm as to appear a part of the vessel itself.

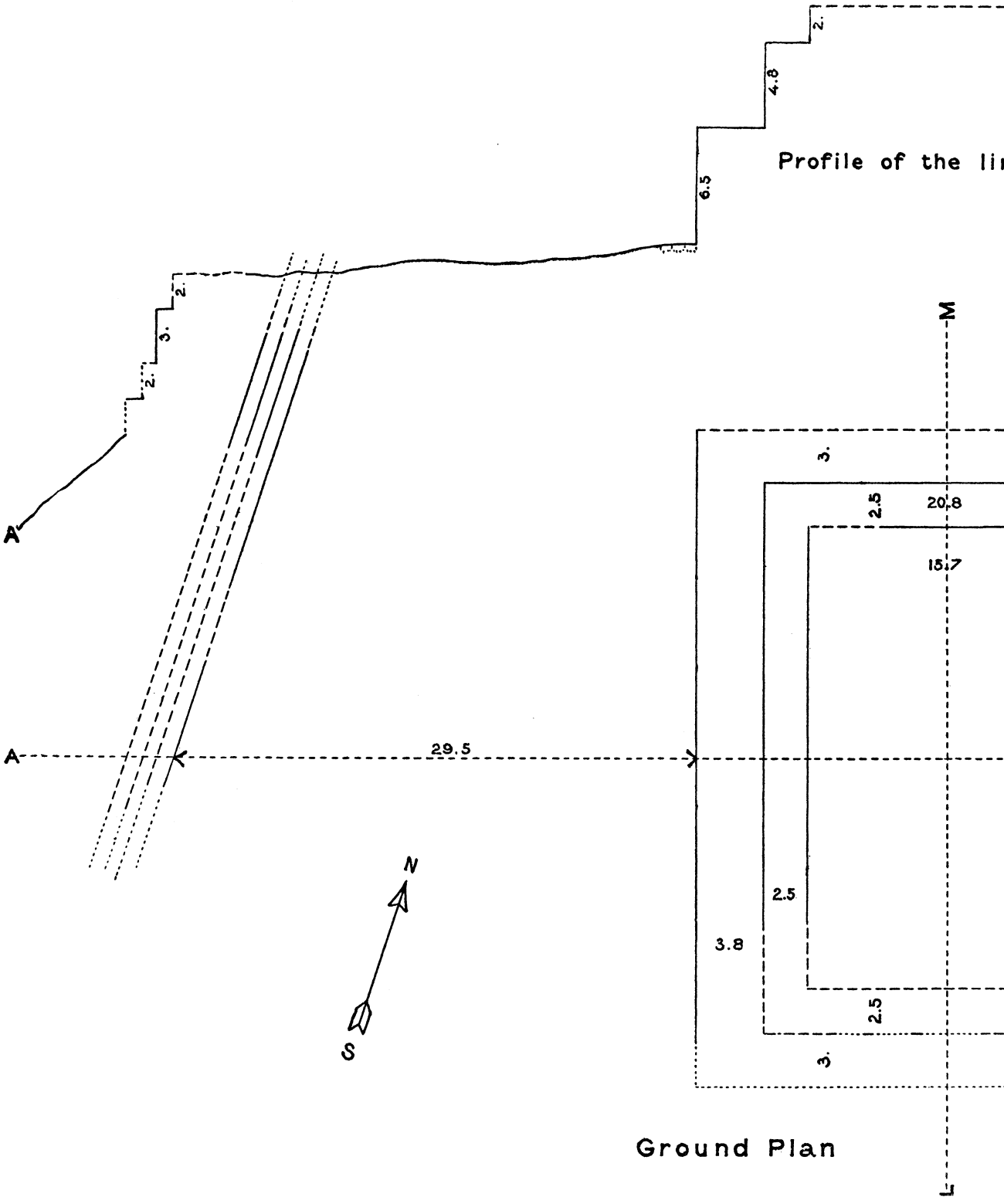
Fragments of pottery are numerous on many sites. Evidently few have been removed, as only entire pieces are sought and preserved. At the station near Haute-Rive, between Neuchâtel and Prefargier, the bottom of the lake for a distance of fifty meters or more was strewn with fragments of pottery and broken bones, with here and there an implement. On that site I collected some interesting pieces. The part still remaining under water was the outer edge of the settlement; the rest is now dry and covered with vegetation, the result of the lowering of the water.

The Iron Age

As has already been stated, there is but one Iron age station on the Lake of Neuchâtel, that at La Tène, which has been so thoroughly explored and has yielded so many objects, chiefly swords and spearheads.

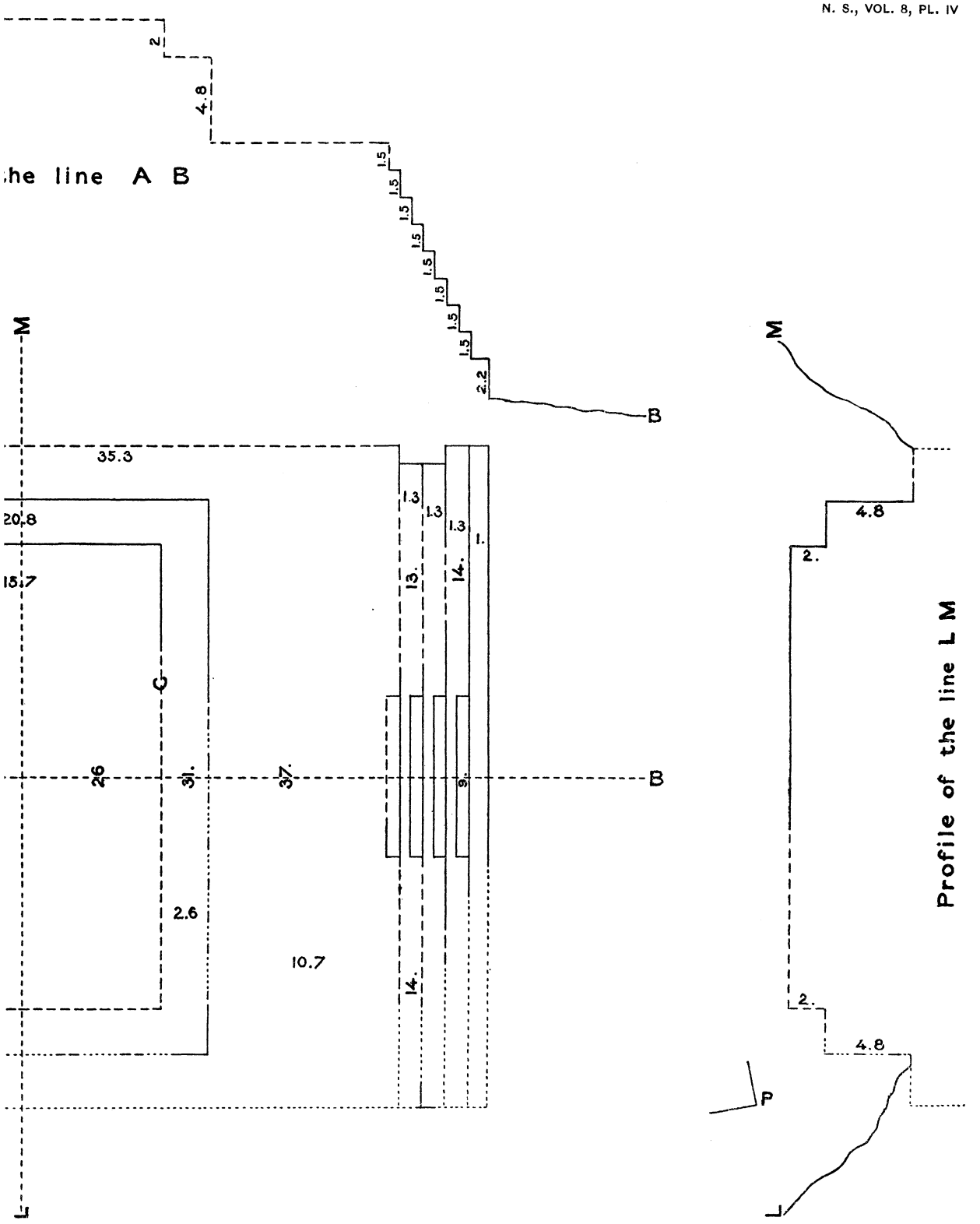
Thus we have on the margin of this lake evidence of long-continued occupancy by man. Many centuries must necessarily have elapsed between the time the first settlements were made during the early Neolithic epoch and the final subjugation of Helvetia by the Roman army, when Aventicum, less than ten miles distant from the lake, became the Roman capital.

Florence, Italy.



GROUND PLAN AND PROFILES OF A STONE RUIN AT SE

Scale 1:100. Measurements in English feet and tenths (approximate). ———— Fairly well preserved. ----



RUIN AT SĒ-T̃SAK, ALTA VERA PAZ, GUATEMALA

ved. – – – – – – – – Ruinous, but traceable. ..... Conjectural; either totally ruined or not cleared.